

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (CURRENTLY AMENDED) A method for selecting one or more Diversity Handover, DHO, nodes, ~~such as a Node B or a Radio Network Controller, RNC,~~ executing a macro diversity functionality, in a mobile telecommunication network wherein the macro diversity functionality is distributed to one or a plurality of DHO nodes ~~such as including a Radio Network Controller, RNC,~~ and its connected Node B(s) in said network, and any DHO enabled node(s) therebetween, the method comprising:

a. ~~[[]]~~ obtaining topology information comprising a hop-by-hop route from the RNC to each of its connected Node Bs and at least one metric for each hop in the route, and

b. ~~[[]]~~ using an algorithm for selecting one or more ~~DHO~~ DHO node(s), whereby the algorithm comprises ~~the steps of:~~

~~[[]]~~ forming a macro diversity tree of the routes ~~by means of based~~ on the obtained topology information, and

~~[[]]~~ selecting the Node B(s) and/or the RNC and/or other DHO enabled node(s), that result in ~~the a~~ a best accumulated metric for all potential data flows between the RNC and its connected Node B(s) in the macro diversity tree of routes, as the DHO node(s),

c. ~~[[]]~~ checking that a maximum allowed delay is not exceeded for a data path for each of the selected one or more DHO node(s) by using the a delay

metric from the topology information, and ~~if~~when the maximum allowed delay is exceeded, ~~[[]]~~performing a delay reduction procedure until the maximum allowed delay is not exceeded,

wherein the delay reduction procedure comprises ~~the step of: [[
]]removing one or more already selected macro-diversity-enabled DHO nodes
from the path.~~

2. (CURRENTLY AMENDED) The method according to claim 1, wherein the topology information further comprises for each non-DHO enabled node in the topology information an indication of ~~the~~a closest DHO enabled node.

3. (CURRENTLY AMENDED) The method according to claim 1, wherein the forming-step comprises ~~the further steps of:~~

~~[[]]identifying branching nodes in said tree of routes, and~~

~~[[]]identifying the relative interconnections of said branching nodes and the connections to Node Bs and the RNC of said branching nodes.~~

4. (CURRENTLY AMENDED) The method according to claim 1, wherein the at least one metric comprises ~~a~~the delay metric and a generic cost metric and ~~that~~wherein the step of selecting the DHO Node(s) with the best accumulated metric comprises ~~the steps of:~~

~~{{ }}~~selecting the DHO node(s) resulting in the smallest accumulated cost for all potential data flows between the RNC and its connected Node B(s) in the macro diversity tree, as the DHO node(s),

if when the accumulated cost is substantially the same for two or more potential DHO nodes, selecting as the DHO node the potential DHO node that results in the smallest accumulated delay metric for all potential data flows between the RNC and its connected Node B(s) in the macro diversity tree.

5. (PREVIOUSLY PRESENTED) The method according to claim 1, wherein the at least one metric comprises a generic cost.

6. (CURRENTLY AMENDED) The method according to claim 1, wherein the at least one metric comprises a the delay metric.

7. (CURRENTLY AMENDED) The method according to claim ~~1~~ 6, ~~wherein the method comprises the further step of comprising:~~

~~{{ }}~~combining the delay metric with node synchronisation measurement in order to determine if the maximum allowed delay is exceeded.

8. (CURRENTLY AMENDED) The method according to ~~any~~ claim 1, wherein the at least one metric comprises a the delay metric and a generic cost metric and wherein the step of selecting the ~~DHO-DHO~~ Node(s) with the best accumulated metric comprises ~~the further steps of:~~

~~[[--]]~~ tentatively selecting a potential DHO node,
~~[[--]]~~ checking whether ~~the~~ a delay of a potential data flow between the RNC and one of its connected Node Bs would exceed ~~a~~ the maximum allowed delay if it were to traverse the ~~tentatively-selected-potential~~ DHO node, and
selecting the ~~tentatively-selected-potential~~ DHO node as a the DHO node for said potential data flow if said maximum allowed delay is not exceeded.

9. (CURRENTLY AMENDED) The method according to claim 1, wherein the topology information is obtained through manual or semi-automatic management operations in the ~~ENG~~ RNC.

10. (CURRENTLY AMENDED) The method according to claim 1, wherein the topology information is obtained via a link state routing protocol used in ~~the~~ a transport network.

11. (PREVIOUSLY PRESENTED) The method according to claim 1, wherein the topology information is obtained by using a traceroute mechanism that allows the RNC to discover the hop-by-hop route to each Node B.

12. (CURRENTLY AMENDED) The method according to claim 1, wherein the topology information is obtained by retrieving the topology information from a neighboring RNC in the network.

13. (CURRENTLY AMENDED) The method according to claim 1, wherein ~~the method comprises the further steps of~~ comprising:

~~[[]]~~preparing a ~~DHO-DHO~~ related ~~signaling~~ signaling message to be conveyed to a DHO tree node that is a node that is or is planned to be a part of ~~a~~ the macro diversity tree,

~~[[]]~~including in the signaling message one or more transport layer addresses and one or more transport bearer reference parameters in order to direct one or more inter-DHO tree node data flows of the macro diversity tree, and

~~[[]]~~sending said signaling message to said DHO tree node in order to provide ~~DHO-DHO~~ related instructions to said ~~DHO-DHO~~ tree node.

14. (CURRENTLY AMENDED) The method according to claim 13, wherein ~~the including step comprises the further step of~~ comprising:

~~[[]]~~replacing the transport layer address and transport bearer reference parameter of ~~an~~ the RNC by the transport layer address and transport bearer reference parameter of a DHO tree node that is hierarchically higher than said DHO tree node in a regular signaling message sent to said DHO tree node in order to direct a data flow between said DHO tree node and said higher DHO tree node in the DHO tree node hierarchy.

15. (CURRENTLY AMENDED) The method according to claim 13, wherein ~~the including step~~ including step ~~comprises the further step of~~:

[-]including one or more transport layer addresses and one or more transport bearer reference parameters of one or more DHO tree node(s) that are hierarchically lower than said DHO tree node in a ~~signalling~~ signaling message sent to said DHO tree node in order to direct one or more data flows between said DHO tree node and said one or more lower DHO tree node(s) in the DHO node hierarchy.

16. (PREVIOUSLY PRESENTED) The method according to claim 13, wherein said transport layer addresses are IP addresses and said transport bearer reference parameters are UDP ports.

17. (CURRENTLY AMENDED) The method according to ~~any~~ claim 13, wherein said transport layer addresses are ATM addresses and said transport bearer reference parameters are SUGR parameters.

18. (CURRENTLY AMENDED) The method according to claim 13, further comprising the step of:

[-]including in the signaling message Quality of Service (QoS) indications for the data flow(s) to be directed.

19. (CURRENTLY AMENDED) The method according to claim 13, further comprising the step of:

~~{-}~~including timing parameters in the signaling message to be used in ~~the an~~ uplink combining procedure in the DHO tree node receiving said signaling message.

20. (CURRENTLY AMENDED) The method according to claim 13, further comprising ~~the step of~~:

~~{-}~~including a time indication in the signaling message indicating when the ~~DUO-DHO~~ related instructions in the ~~signalling signaling~~ message are to be effectuated in the ~~DUO-DHO~~ tree node receiving said signaling message.

21. (ORIGINAL) The method according to claim 20, wherein said time indication is a connection frame number, CFN, pertaining to a Dedicated Channel Frame Protocol, DCH FP, in a UMTS Terrestrial Radio Access Network, UTRAN.

22. (CURRENTLY AMENDED) The method according to claim 13, wherein said signaling message is sent from a neighboring RNC.

23. (ORIGINAL) The method according to claim 22, wherein said signaling message is a Node B Application Part, NBAP, message.

24. (PREVIOUSLY PRESENTED) A computer program product directly loadable into the internal memory of a computer within a Radio Network

Controller and/or a Node B in a mobile telecommunication network,
comprising the software code portions for performing the steps of claim 1.

25. (CURRENTLY AMENDED) A computer program product stored on a ~~[[H]]~~ computer usable medium, comprising a readable program for causing a computer, within a Radio Network Controller and/or a Node B in a mobile telecommunication network, to control an execution of the steps of claim 1.

26. (CURRENTLY AMENDED) A Radio Network Controller, RNC, adapted for selecting a one or more Diversity Handover, DHO, node nodes, e.g., a Node B or a RNC executing a macro diversity functionality in a mobile telecommunication system, wherein the macro diversity functionality is distributed to one or a plurality of DHO nodes such as ~~a Radio Network Controller, the~~ RNC, ~~and its~~ connected Node Bs in said network and any DHO enabled node(s) therebetween, the RNC comprising:

means for obtaining topology information comprising a hop-by-hop route from the RNC to each of its connected Node Bs and at least one metric for each hop in the route, ~~and~~

means for using an ~~algorithm for~~ selecting one or more DHO node(s),
whereby said means comprises ~~further~~:

means for forming a macro diversity tree of the routes ~~by means of~~
based on the obtained topology information, and

means for selecting the Node B(s) and/or the RNC and/or other DHO enabled node(s), that result in ~~the a~~ best accumulated metric for all potential data flows between the RNC and its connected Node B(s) in the macro diversity tree of routes, as the DHO node(s), and further means for ~~for~~ checking that a maximum allowed delay is not exceeded for a data path for each of the selected one or more DHO node(s) by using the delay metric from the topology information, and if the ~~maximum allowed delay is exceeded~~, ~~for~~ means for performing, when the maximum allowed delay is exceeded, a delay reduction procedure until the maximum allowed delay is not exceeded, wherein the ~~means for performing a~~ delay reduction procedure comprises ~~means for removing one or more already selected macro diversity enabled DHO nodes from the path.~~

27. (CURRENTLY AMENDED) The RNC according to claim 26, wherein the topology information further comprises for each non-DHO enabled node in the topology information an indication of ~~the a~~ closest DHO enabled node.

28. (CURRENTLY AMENDED) The RNC according to claim 26, wherein the means for forming a ~~the~~ macro diversity tree further comprises means for: ~~for~~ means for identifying branching nodes in said tree of routes, and means for ~~for~~ identifying the relative interconnections of said branching nodes and the connections to Node Bs and the RNC of said branching nodes.

29. (CURRENTLY AMENDED) The RNC according to claim 26, wherein the at least one metric comprises a ~~the~~ delay metric and a generic cost metric and ~~that wherein~~ the means for selecting the DHO Node(s) with the best accumulated metric comprises ~~means for~~:

~~[]~~ means for selecting the DHO node(s) resulting in the smallest accumulated cost for all potential data flows between the RNC and its connected Node B(s) in the macro diversity tree, as the DHO node(s), and

~~if the accumulated cost is substantially the same for two potential DHO nodes,~~

~~means for,~~ when the accumulated cost is substantially the same for two or more potential DHO nodes, selecting as the ~~DHO-DHO~~ node the potential ~~DHO-DHO~~ node that results in the smallest accumulated delay metric for all potential data flows between the RNC and its connected Node B(s) in the macro diversity tree.

30. (PREVIOUSLY PRESENTED) The RNC according to claim 26, wherein the at least one metric comprises a generic cost.

31. (CURRENTLY AMENDED) The RNC according to claim 26, wherein the at least one metric comprises a ~~the~~ delay metric.

32. (CURRENTLY AMENDED) The RNC according to claim 31, wherein the RNC further comprises ~~the further~~ means for combining the delay metric

with node synchronisation measurement in order to determine if the maximum allowed delay is exceeded.

33. (CURRENTLY AMENDED) The RNC according to claim 26, wherein the at least one metric comprises a ~~the~~ delay metric and a generic cost metric and wherein the means for selecting the DHO Node(s) with the best accumulated metric comprises: ~~the further~~

means for ~~[[--]]~~ tentatively selecting a potential DHO node,

means for checking whether the a delay of a potential data flow between the RNC and one of its connected Node Bs would exceed a ~~a~~ the maximum allowed delay if it were to traverse the ~~tentatively selected potential~~ potential DHO node, and

means for selecting the ~~tentatively selected potential~~ DHO node as a ~~a~~ the DHO node for said potential data flow if said maximum allowed delay is not exceeded.

34. (PREVIOUSLY PRESENTED) The RNC according to claim 26, wherein the topology information is obtained through manual or semi-automatic management operations in the RNC.

35. (CURRENTLY AMENDED) The RNC according to claim 26, wherein the topology information is obtained via a link state routing protocol used in ~~the a~~ a transport network.

36. (PREVIOUSLY PRESENTED) The RNC according to claim 26, wherein the topology information is obtained by using a traceroute mechanism that allows the RNC to discover the hop-by-hop route to each Node B.

37. (CURRENTLY AMENDED) The RNC according to claim 26, wherein the topology information is obtained by retrieving the topology information from a neighboring RNC in the network.

38. (CURRENTLY AMENDED) The RNC according to claim 26, wherein the RNC further comprises ~~the further means for:~~

~~the further means for~~ preparing a DHO related ~~signalling~~ signaling message to be conveyed to a DHO tree Node that is a node that is or is planned to be a part of a macro diversity tree,

~~the further means for~~ including in the signaling message one or more transport layer addresses and one or more transport bearer reference parameters in order to direct one or more inter-DHO tree node data flows of the macro diversity tree, and

means for ~~the further means for~~ sending said signaling message to said DHO tree Node in order to provide DHO related instructions to said DHO tree node.

39. (CURRENTLY AMENDED) The RNC according to claim 38, wherein the means for including comprises ~~the further means for~~ replacing the transport layer address and transport bearer reference parameter of ~~an~~ the

RNC by the transport layer address and transport bearer reference parameter of a DHO tree node that is hierarchically higher than said DHO tree node in a regular signaling message sent to said DHO tree node in order to direct a data flow between said DHO tree node and said higher DHO tree node in the DHO tree node hierarchy.

40. (CURRENTLY AMENDED) The RNC according to claim 38, wherein the means for including comprises ~~the further means for including~~ one or more transport layer addresses and one or more transport bearer reference parameters of one or more DHO tree node(s) that are hierarchically lower than said DHO tree node in a ~~signalling~~ signaling message sent to said DHO tree node in order to direct one or more data flows between said first DHO tree node and said one or more lower DHO tree node(s) in the DHO tree node hierarchy.

41. (PREVIOUSLY PRESENTED) The RNC according to claim 38, wherein said transport layer addresses are IP addresses and said transport bearer reference parameters are UDP ports.

42. (CURRENTLY AMENDED) The RNC according to claim ~~28~~ 38, wherein said transport layer addresses are ATM addresses and said transport bearer reference parameters are SUGR parameters.

43. (CURRENTLY AMENDED) The RNC according to claim 38, further ~~comprises~~ comprising means for including in the signaling message Quality of Service (QoS) indications for the data flow(s) to be directed.

44. (CURRENTLY AMENDED) The RNC according to claim 38, further ~~comprises~~ comprising means for including timing parameters in the signaling message to be used in the uplink combining procedure in the DHO tree node receiving said signaling message.

45. (CURRENTLY AMENDED) The RNC according to claim 38, further comprises means for including a time indication in the signaling message indicating when the DHO related instructions in the ~~signalling~~ signaling message are to be effectuated in the DHO tree node receiving said signaling message.

46. (ORIGINAL) The RNC according to claim 45, wherein said time indication is a connection frame number, CFN, pertaining to a Dedicated Channel Frame Protocol, DCH FP, in a UMTS Terrestrial Radio Access Network, UTRAN.

47. (PREVIOUSLY PRESENTED) The RNC according to claim 38, wherein said signaling message is a Node B Application Part, NBAP, message.

48. (NEW) The method according to claim 1, wherein plural DHO nodes remain after completing the delay reduction procedure.

49. (NEW) The method according to claim 1, wherein the macro diversity functionality remains after completing the delay reduction procedure.

50. (NEW) The method according to claim 1, wherein the macro diversity tree consists of only the Node B(s), the RNC, and/or branching nodes.

51. (NEW) The RNC according to claim 26, wherein plural DHO nodes remain after the means for performing the delay reduction procedure completes performing the delay reduction procedure.

52. (NEW) The RNC according to claim 26, wherein the macro diversity functionality remains after the means for performing the delay reduction procedure completes performing the delay reduction procedure.

53. (NEW) The RNC according to claim 26, wherein the macro diversity tree consists of only the Node B(s), the RNC, and/or branching nodes.

54. (NEW) A method to select one or more DHO (Diversity Handover) nodes to perform macro diversity functionality in a mobile communications network for a mobile terminal, comprising:

obtaining a topology information of the mobile communications network, wherein the topology information includes a generic cost metric for each hop and a delay metric different than the generic cost metric also for each hop;

forming route tree for plural data paths from an RNC of the mobile communications network to plural Node Bs of the mobile communications network involved in the macro diversity;

identifying all branching nodes in the route tree;

for each branching node, selecting a candidate DHO node, wherein the candidate DHO node corresponding to the branching node is a DHO enabled node with a smallest accumulated generic cost metric between the branching node and the candidate DHO node; and

for each data path of the plural paths corresponding to a path between the RNC and one of the Node Bs involved in the macro diversity, selecting among the candidate DHO nodes that ensure that an accumulated delay of the data path does not exceed a predetermined maximum allowed delay as the DHO nodes for the path.

55. (NEW) The method according to claim 54, wherein the act of selecting among the candidate nodes for the data path comprises:

determining, based on the delay metrics of the hops in the data path, whether the accumulated delay in the data path is greater than the predetermined maximum allowed delay;

removing one or more candidate DHO nodes for the data path until the accumulated delay does not exceed the predetermined maximum allowed delay; and

selecting the remaining candidate DHO node or nodes as the DHO node or nodes for the data path.

56. (NEW) The method according to claim 54, wherein plural DHO nodes are selected.

57. (NEW) The method according to claim 54, further comprising:
forming a simplified schematic tree based on the route tree, wherein the simplified schematic tree only includes the RNC, the Node Bs, and the branching nodes,

wherein the act of identifying all branching nodes includes identifying the branching nodes based on the simplified schematic tree.